IDAHO
DEPARTMENT OF FISH & GAME

Jerry M. Conley, Director

HAYDEN CREEK HATCHERY

Annual Report

1 October 1981 - 31 July 1982

by

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Fish Hatchery Superintendent I

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ABSTRACT

This year we produced 2,259.2 pounds of fish at a feed cost of $1,432.78. We received 569,900 eyed eggs from the Pahsimeroi Hatchery and the spawning operation at Granite Creek. The total fish planted for the year was 1,013,067, weighing 2,037.4 pounds.

A chinook smolt-imprinting experiment was conducted with morpholine, but the results will not be available until the run is completed in 1984.

One hundred seven adult chinook returned to the Hayden Creek trap this year.

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OBJECTIVES

To investigate and explore various methods and techniques of rearing chinook salmon to the smolt stage in dirt-bottomed ponds.

To determine those rearing and handling procedures that maximize the quality and quantity of smolt, and promote maximum smolt survival and adult contribution and returns.

INTRODUCTION

The Hayden Creek Hatchery was established in the 1960's as an experimental station to work with the pond rearing of steelhead. In 1969 some work was begun with chinook salmon. Beginning with the spring release in 1979, all steelhead smolt releases were discontinued and chinook salmon smolt production became the priority.

In the spring of 1981 the hatchery went from a two-man to a one-man station. On 1 July 1981, the station was transferred from research to hatcheries.

The hatchery is located about 3.5 miles southwest of the Lemhi, Idaho, Post Office and store. The elevation is about 5,200 feet. The facility consists of two .6-acre ponds, two 200-foot raceways, and an egg house with ten 16-tray Heath stack-type incubators. The water sources are from Hayden Creek and a large spring that flows about eight cubic feet of water per second. The creek temperature varies from 32 F to 65F, while the average spring temperature is nearly constant at around 52 F.

FISH PRODUCTION

Fish production is summarized in Table 1.

Table 1. Fish Production.

Parent stock or species	Number on hand at start of year			Received or taken during year	Number planted or transferred during year		Pounds, produced
	Eggs	Fish	Pounds	Eggs	Fish	Pounds	
Hayden Creek spring chinook	96,300	17,971	421		81,122	1,801.0	1,380.0
Pahsimeroi Steelhead-Class A				1,305,872	783,605	219.2	219.2
Kokanee				1,264,110	454,740	660.0	660.0
Totals	96,300	17,971	421	2,569,982	1,319,467	2,680.2	2,259.2

FISH HEALTH

With the construction of a larger headrace for the Hayden Creek water supply in 1979 and a change in rearing practices, disease at the hatchery has ceased to be a problem.

Prior to the aforementioned changes, bacterial gill diseases and Costia were constant problems. From the time the fish were put into the raceways until they were removed, treatments of Purina 4X and Formalin were regular occurrences. The disease and treatments were the causes of high mortality for many years.

During the fall of 1981 and until the first of July 1982, kokanee were also raised at the station. Starting **in** April, these fish began to die in substantial numbers. After being checked by the pathologist, these fish were treated with salt and Purina 4X to control bacterial gill disease. These treatments only seemed to slow the mortality. I feel the reason for most of the loss was due to keeping this species in the hatchery environment for too long.

FISH TRANSFERS

This year 64,200 chinook salmon and 240,200 steelhead were moved to the Pahsimeroi Hatchery. The chinook were transferred in preparation for the closing of the Hayden Creek Hatchery on 1 July 1982. These fish averaged 11.7 at the time of transport. The steelhead were transferred to replace fry losses at Niagara Springs Hatchery. The steelhead were moved as swim-up fry.

We also transferred 454,740 kokanee, at 689/lb, to Clark Fork Hatchery for planting in Sullivan Springs.

FISH RELEASES

The fish-released data is summarized by species in Table 2, "Fish Planted." We planted a total of 1,013,067 fish for a weight of 2,037.4 pounds.

Table 2. Fish planted.

Parent stock or species	Number released	Size at release	Pounds released	Receiving area	Receiving water
Hayden Creek spring chinook	16,922	13.8/lb	1,226.0	Region 6	Hayden Creek
Pahsimeroi	164,853	3,576.0/lb	46.1	Region 6	Lemhi River
Steelhead	285,007	3,576.0/lb	79.7	Region 6	Lemhi Big Springs Creek
Class A	91,545	3,576.0/lb	25.6	Region 6	Bear Valley Creek
Kokanee	454,740	689.0/lb	660.0	Region 1	Sullivan Springs
Totals	1,013,067		2,037.4		

ADULT RETURNS

Spring Chinook

All adult chinook returning to the station were transferred to the Pahsimeroi Hatchery. A total of 107 adult spring chinook returned to the Hayden Creek Trap in 1982. Thirteen were classified as one-ocean third-year-of-life fish, 48.3 61.0 cm (19-24 in) in length, and 94 as two-ocean fourth-year-of-life returnees, 61.0-83.8 cm (24-33 in) in length for females and 61.0-88.9 cm (24-35 in) in length for males (Table 3). Out of the returning adults, 20 had adipose clips. These fin-clipped fish only contained one third-year-of-life fish. The snouts were recovered at spawning time and sent to the Lewiston, Idaho, coded-wire tag recovery lab for reading.

Steelhead

No steelhead were trapped in 1982. A summary of previous adult steelhead returns can be found in Table 4.

FISH FEED UTILIZED

Manufacturer	Type of feed	Feed size	Pounds of fish feed	Cost
Moore Clark	OMP	Starter	550	237.50
Moore Clark	OMP	1/32 pellets	800	302.50
Moore Clark	OMP	3/64 pellets	850	321.88
Moore Clark	OMP	1/16 pellets	500	188.75
Rangen	Dry	3/32 pellets	1,650	338.37
Rangen	Dry	4/32 pellets	250	43.78
		Totals	4,600	1,432.78

The total pounds of fish produced was 2,259.2 pounds. This results in a conversion rate of 2.0 pounds of feed per pound of fish flesh produced. Feed costs per pound of fish produced was $.63.

Table 3. Summary of spring chinook smolt releases and adult returns to Hayden Creek Hatchery since 1971.

Brood year	Year released	Number juveniles released	Number Marked	Mark used	River race	Numbers adults returned as: one-ocean fish	two-ocean fish	three-ocean fish
1971	1972 (Oct)	312,000	73,000	RV, L Max	Rapid River	38 (1974)	120 (1975)	10 (1975)
1972	1973 (Oct)	151,000	0	---	Rapid River	27 (1975)	89 (1976)	4 (1977)
1973	1974 (Sept)	350,000	0	---	Rapid River	9 (1976)	45 (1977)	13 (1978)
1974	1975 (Oct)	276,000	0	---	Rapid River	5 (1977)	74 (1978)	7 (1979)
1974	1976 (April)	6,000	6,000	R Max	Rapid River	0 (1977)	0 (1978)	0 (1979)
1975	1976 (Sept)	255,000	0	---	Hayden Creek-Rapid River Mix	19 (1978)	___ (1979)	--- (1980)
1976	1977 (April)	99,000	9,600	AD-CWT	Rapid River	0 (1978)	--- (1979)	241 (1980)
1976	1977 (Sept)	86,000	86,000	AD-CWT	Hayden Creek-Rapid River Mix	0 (1979)	4 (1980)	(1981)
1976.	1977 (Oct)	75,500	0	---	Hayden Creek-Rapid River Mix	3 (1979)	12 (1980)	– (1981)
1976	1978 (April)	15,300	15,300	AD-CWT	Rapid River	3 (1979)	15 (1980)	(1981)
1977	1979 (April)	176,500	58,200	AD-CWT	Rapid River	17 (1980)	83 (1981)	– (1982)
1978	1980 (April)	424,400	83,100	AD-CWT	Rapid River	5 (1981)	___ (1982)	– (1983)
1979	1981 (April)	606,000	103,000	AD-CWT	Hayden Creek-Rapid River Mix	(1982)	___ (1983)	– (1984)

Table 4. Summary of steelhead smolt releases and adult returns to Hayden Creek Research Station since 1970.

Brood year	Year released	Number juveniles released	Number marked	Mark used	River race	Number adults returned one-ocean fish	two-ocean fish
1970	1971 (May)	72,000	38,000	LV	Lemhi Weir, 1970 return	5 (1973)	17(1974)
1970	1972 (March)	87,500	50,000	LV	Lemhi Weir, 1970 return	3 (1974)	2 (1975)
1971	1973 (April)	31,700	13,800	LV	Lemhi Weir, 1971 return-P	2 (1975)	23 (1976)
1972	1973 (Nov)	47,000	0	--	Lemhi Weir, 1972 return-	-21 (1976)	18 (1977)
1973	1974 (April)	80,000	0	--	Clearwater-		
1973	1975 (April)	229,000	0	--	Clearwater-Hayden Creek	6 (1977)	20 (1978)
1975	1976 (April)	125,000	0	--	Washougal	0 (1978)	8 (1979
1976	1977 (April)	100,000	100,060	CWT&"'i)	Washougal	0 (1979)	0 (1980)
1976	1977 (April)	99,000	0	--	Washougal	0 (1979)	0 (1980)
1977	1978 (April)	117,500	0	--	Washougal	0 (1980)	(1981)
1977	1978 (April)	119,300	0	--	Clearwater	0 (1980)	__ (1981)
1978	1979 (April)	59,300	0	--	Washougal	1 (1981)	_(1982)

SPECIAL STUDY

Morpholine Experiment

Since the initial construction of the Hayden Creek adult collection facilities in the late 1960's, adult bypassing of the hatchery entrance has been a problem. Poor ladder attraction flows: and spring seeps above the hatchery result in substantial portions of returning adults. bypassing the facility and spawning in Hayden Creek in the vicinity of the station. Experiments: with temporary weirs have not been successful.

Scholz (1973) demonstrated that coho salmon could be imprinted and returned back to a specific location with the use of the chemical morpholine at concentrations as low as $5 \times 10.^{-5}$ mg/1. In 1979 we initiated a morphone-homing experiment at Hayden Creek to determine if the use of this imprinting chemical will help to reduce bypass of returning adults: from the hatchery.

Between 3-16 March 1980, a drip application of morpholine at a rate of one mg per 54 hours was metered into the north pond for a period of 303 hours: (12 1/2 days) to imprint the spring chinook being reared in the pond. Prior to release of the chinook on 31 March., 41,600 were given an adipose clip and a coded-wire tag. A similar number were also tagged in the adjoining untreated (south) pond as an experimental control.

In April 1981 we again imprinted spring chinook salmon smolts to morpholine. A drip application was applied to the south raceway at the same concentration ($5 \times 10\text{-}^{0}$ mg/1) as in the previous experiment.

After the fish were tagged, they were discharged into the south raceway with the morpholine present. In the raceway the fish were allowed to recuperate from the anesthetic used in tagging. The bottom raceway screen was removed so the smolts could migrate freely.

No specific exposure time could be calculated for each fish, but it is believed that most of the smolts were exposed to the morpholine for several hours.

The nonimprinted marked fish were handled in the same manner, but with no morpholine present.

Commencing in 1981 and continuing through 1984, morpholine concentrate will be dripped into the fish ladder leading to the station trap during the June-September adult chinook migration period. Returns of tagged fish to the station and recovery of kelts in Hayden Creek will allow us to determine the effectiveness of the chemical in attracting imprinted versus nonimprinted adults into the trap.

Return of wire tags from marked adults will help us determine if morpholine-imprinted upper Salmon River-bound fish are attracted into lower Columbia River facilities using the chemical, or if excessive straying insues compared to nonimprinted fish. We theorize that a strong attraction to the morpholine will not occur until the fish are on the final approach_ to their home tributary stream.

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Hatchery staff during the year included:

Daniel J. Beers, Fish Hatchery Superintendent I and

Gary L. Anderson, Laborer.

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